OKLAHOMA
AGRICULTURAL AND MECHANICAL COLLEGE
AGRICULTURAL EXPERIMENT STATION
C. P. BLACKWELL, Director
Stillwater, Oklahoma

The Ferns of Oklahoma

H. I. FEATHERLY
Associate Professor of Botany

and

CLARA E. STILL
M. S., 1933, Oklahoma A. & M. College

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INTRODUCTION

It has been the purpose of the authors in the preparation of this bulletin to present keys and drawings which will enable even the least technically trained person to identify any of the native ferns of the state. The phylogenetic relationships of the ferns have been ignored for simplicity, and technical terms have been reduced to a minimum. Instead of a minute description of each species, only the outstanding features and differences are mentioned. In the drawings we have tried to show the "earmarks" of the species, hence if the brief, printed description is not sufficient for identification, the drawing may be turned to for comparison. The boldface numbers in the key refer to the description of the respective ferns, which are numbered consecutively.

This bulletin could not have appeared for some time to come if it had not been for the works of other fern students and the splendid cooperation of other botanists of the state. The authors wish here to acknowledge the work of C. F. Greene (Amer. Fern Jour. 17, 1927) and of B. F. Bush (Amer. Midland Nat. 12, 1930) on the ferns of Oklahoma. We are indebted to Mr. Wm. R. Maxon of the National Herbarium and Mr. J. M. Greenman of the Missouri Botanical Garden for help in securing descriptions, for loan of material and for checking identifications. No taxonomic work of the ferns or flowering plants of the state could hardly be complete without mentioning the work of Dr. G. W. Stevens, who has collected more in Oklahoma than any other man. The writers wish also to thank Mrs. Margaret Nice, who so generously gave us her unpublished notes on the ferns of the state, and Dr. Paul B. Sears, Head of the Botany Department of the University of Oklahoma, for use of material and the Departmental Library.

KEY TO THE FERNS OF OKLAHOMA

The ferns are flowerless plants usually with underground stems. Only the fronds (leaves) in our species appear above ground. The fronds are circinate, entire to tripinnate, often with brown spots (sori) on the lower surface. The sori are borne in various ways on the fronds or parts of the frond. The part of a frond bearing sori is termed the fertile part, and the part without them the sterile part. Some ferns have sori on all of the pinnae while others have them only on special modified pinnae. Some have the fertile part of the frond in spikes or panicles remote from the sterile part, and yet others have fertile fronds and sterile fronds.

1. Plants with creeping rootstocks 2
   Plants without creeping rootstocks ..... 1. Ophioglossaceae

2. Fronds radiately 4-foliate ..... 2. Marsileaceae
   Fronds not radiately 4-foliate 3

3. Sori borne in panicles ..... 3. Osmundaceae
   Sori borne on back or margins of fronds or leaflets (Onoclea appears to be different) ..... 4. Polypodiaceae

OPHIOGLOSSACEAE

Sterile segment of fronds entire ..... 1. Ophioglossum
Sterile segment of fronds not entire ..... 2. Botrychium

OPHIOGLOSSUM (Tourn.) L.

Sterile segment of fronds elliptical; fertile segment a spike ..... O. engelmannii 1

BOTRYCHIUM Sw.

Sterile segment on long petiole from near base of frond ..... 1. B. obliquum*
Sterile segment sessile about middle of frond ..... 2. B. virginianum 2

MARSILEACEAE

Marsilea L.

Plants aquatic or amphibious ..... Marsilea vestita 3

OSMUNDACEAE

Osmunda (tourn.) L.

Pinnae pinnate ..... 1. O. regalis 4
Pinnae pinnatifid ..... 2. O. cinnamomea 5

POLYPODIACEAE

1. Fronds covered with peltate scales below ..... 1. Polypodium
   Fronds not covered with peltate scales below 2

2. Indusia present (inconspicuous in Woodsia oregana) 3
   Indusia absent 7

3. Indusia formed by revolute margin of frond 4
   Indusia not formed by revolute margin of frond 8

4. Sori distinct ..... 2. Adiantum
   Sori forming a continuous marginal band 5

5. Stipe, stout, green ..... 3. Pteris
   Stipe, slender, dark brown to ebony color 6

6. Pinnae glabrous ..... 4. Pellaea
   Pinnae not glabrous (except C. alabamensis) ..... 5. Cheilanthes

7. Fronds green on both surfaces ..... 6. Phegopteris
   Fronds not as above ..... 7. Notholaena

8. Pinnules of fertile fronds berry-like or pod-like; sterile fronds pinnatifid ..... 8. Onoclea
   Pinnules of fertile fronds not berry-like or pod-like 9

9. Indusia peltate or laterally attached 10
   Indusia attached beneath the sorus ..... 9. Woodsia

10. Sori more or less linear 11
    Sori orbicular or reniform 13

11. Fronds entire, simple, rooting at tips ..... 10. Camptosorus
    Fronds pinnatifid or pinnate to tripinnate, seldom rooting at tips 12

12. Fronds tall, herbaceous; stipes green or greenish, not filiform ..... 11. Athyrium
    Fronds small, evergreen; stipes greenish to black, filiform ..... 12. Asplenium

13. Indusia attached centrally 14
    Indusia attached laterally ..... 13. Cystopteris

14. Indusia orbicular-peltate ..... 14. Polystichum
    Indusia reniform, or orbicular with sinus or depression on one side ..... 15. Aspidium

*Reported by B. F. Bush from Sapulpa (855) Sept. 1894 and (1057) in May, 1895 but not seen by authors.

POLYPODIUM (Tourn.) L.

Small, rock or epiphytic ferns ..... Polypodium polypodioides 6

NOTHOLAENA R. Br.

1. Fronds scaly, not whitish or yellowish beneath ..... 1. N. sinuata 7
   Fronds not scaly, whitish or yellowish beneath 2

2. Fronds palmate ..... 2. N. standleyi 8
   Fronds not palmate ..... 3. N. dealbata 9

ADIANTUM (Tourn.) L.

First branch of frond dichotomous ..... 1. A. pedatum 10
First branch of frond lateral ..... 2. A. capillus-veneris 11

PTERIS L.

Fronds bipinnate, lower pinnules pinnatifid ..... Pteris aquilina 12

PELLAEA Link.

1. Stipe and rachis hirsute; lateral veins of pinnae visible ..... 1. P. atropurpurea 13
   Stipe and rachis not hirsute; lateral veins of pinnae invisible 2

2. Pinnae mucronate ..... 2. P. wrightiana 14
   Pinnae rounded at apex ..... 3. P. glabella 15

CHEILANTHES Sw.

1. Pinnae glabrous on both sides ..... 1. C. alabamensis 16
   Pinnae not glabrous on both sides 2

2. Pinnae glabrous above, long, tapering, brown scales below 7
   Pinnae not glabrous above or below 3

3. Pinnae hirsute with crooked, jointed hairs ..... 2. C. lanosa 17
   Pinnae not hirsute with crooked, jointed hairs 4

4. Pinnae with short, spinose hairs ..... 3. C. horridula 18
   Pinnae without short, spinose hairs; wooly or tomentose 5

5. Pinnae not scaly beneath ..... 4. C. feei 19
   Pinnae more or less scaly beneath 6

6. Pinnules densely matted tomentose beneath, recurved margins forming scant indusium ..... 5. C. eatoni 20
   Pinnules loosely matted, tomentose beneath, recurved, forming normal indusium ..... 6. C. tomentosa 21

7. Scales on lower side of pinnae ciliate ..... 7. C. wootoni 22
   Scales on lower side of pinnae not ciliate ..... 8. C. fendleri 23

WOODSIA R. Br.

Indusia at first covering the sorus, later spreading ..... 1. W. obtusa 24
Indusia concealed, inconspicuous ..... 2. W. oregana 25

CAMPTOSORUS Link.

Fronds entire, evergreen, long-attenuate ..... Camptosorus rhizophyllus 26

ASPLENIUM L.

1. Fronds pinnate 2
   Fronds pinnatifid 5

2. Pinnae auriculate 4
   Pinnae not auriculate 3

3. Pinnae slightly crenate ..... 1. A. trichomanes 27
   Pinnae incised, or pinnatifid into oblong lobes ..... 2. A. bradleyi 28

4. Pinnae mostly opposite, entire or crenulate ..... 3. A. parvulum 29
   Pinnae mostly alternate, serrate or incised ..... 4. A. platyneuron 30

5. Lobes many, roundish, ovate ..... 5. A. pinnatifidum 31
   Lobes few, narrow, linear-oblong, curved ..... 6. A. septentrionale 32

CYSTOPTERIS Bernh.

1. Fronds lanceolate, attenuate; often bearing bublets beneath; rachis wingless ..... 1. C. bulbifera 33
   Fronds oblong-lanceolate, bulbless; rachis winged or margined ..... 2. C. fragilis 34

POLYSTICHUM Roth.

Pinnae half-halberd-shaped ..... Polystichum acrostichoides 35

ASPIDIUM Sw.

1. Stipes and rootstocks nearly naked ..... 1. A. thelypteris 36
   Stipes and rootstocks scaly 2

2. Sori close to the margins ..... 2. A. marginale 37
   Sori not close to the margins ..... 3. A. filix-mas 38

PHEGOPTERIS (Presl.) Fee.

Pinnae sessile on a winged rachis ..... P. hexagonoptera 39

ONOCLEA L.

Fertile fronds contracted, closely bipinnate ..... O. sensibilis 40

ATHYRIUM (Roth.) J. Sm.

Fronds bipinnate 1 to 3.5 ft. long ..... A. asplenioides 41

1. Ophioglossum engelmannii Prantl. Adder's-tongue. Snake's-tongue.

Fronds 2 to 8 in. long consisting of a fertile spike and a sterile, entire, elliptical segment.

Found on dry prairies, rich woodlands, moist creek banks or rocky soils.

Distribution: Arbuckle Mts., Gould; Braggs Mt., Little; Cotton Co., Greene; Logan Co., Stevens; Murray Co., Stevens; Okfuskee Co., Greene; Osage Co., Greene; Payne Co., Stevens; Stephens Co., Greene; Rogers Co., Greene; Murray Co., Nice & Nice; Comanche Co., Nice & Nice; Choctaw Co., Palmer; Craterville, Featherly; Murray Co., Featherly; Stillwater, Featherly & Still.

Fig. 1. *Frond showing spike and sterile segment.*

2. Botrychium virginianum (L.) Sw. Virginia Grape Fern. Rattlesnake Fern.

Frond from 1 to 2 ft. long. The frond consists of a sterile and fertile segment. The sterile segment is attached sessile above the middle of the frond and it is divided into three main branches which in turn are subdivided one or two times. The fertile segment is a terminal panicle of sori.

Found in rich woodland soil which is acid to slightly base.

Distribution: McCurtain Co., Little & Olmsted; Pushmataha Co., Little & Olmsted; Tulsa Co., Greene; Le Flore Co., Stevens; Payne Co., Stevens; Murray Co., Nice & Nice.

Fig. 2. *Frond showing fertile and sterile segment.*

3. Marsilea vestita Hook. & Grev. Waterfern. Hairy Pepperwort.

Fronds 1 to 5 in. long, 4-foliate somewhat resembling a 4-leaf clover. The spores are borne in little pod-like structures on the rootstocks.

Found in shallow ditches, the edges of ponds and in buffalo wallows. It prefers a slightly acid soil.

Distribution: Alfalfa Co., Stevens; Johnston Co., Stevens; Payne Co., Stevens; Creek Co., Bush; Texas Co., Stevens; Woods Co., Stevens; Craterville, Featherly; Payne Co., Featherly; Pawnee Co., Featherly and Still.

Fig. 3. *A frond.*

4. Osmunda regalis L. Royal Fern. Bog-onion. Flowering Fern.

Fronds 2 to 6 ft. long, glabrous, bipinnate; the sterile pinnae oblong-ovate to oblong-lanceolate; the fertile pinnae forming a terminal panicle which is at first green but later becomes brown.

This fern is found on poorly drained soils with a neutral or acid reaction.

Distribution: Bokhoma, Clark; Le Flore Co., Stevens; Osage Co., Greene; Creek Co., Bush; Le Flore Co., Palmer; Wilburton, Featherly; McCurtain Co., Featherly and Still.

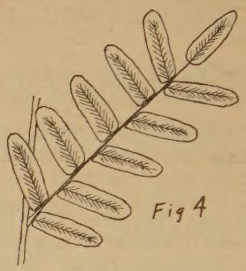


Fig. 4. *A sterile pinna.*

5. Osmunda cinnamomea L. Cinnamon-fern. Bread-root. Fiddle-heads. Swamp-brake.

Fronds 2 to 5 ft. long, covered with rusty-colored wool when young, later becoming more or less glabrous; sterile fronds in a circular cluster, pinnate with the pinnae pinnatifid; fertile fronds in the center of the cluster.

Found in moist soils and lowlands.

Distribution: Antlers, Palmer; Pushmataha Co., Palmer; McCurtain Co., Palmer; Osage Co., Stevens; McCurtain Co., Featherly and Still.

Fig. 5. *Sterile pinna.*

6. Polypodium polypodioides (L.) Hitche. Rock-brake. Resurrection Fern.

Evergreen. Fronds 2 to 8 in. long, more or less leathery, pinnatifid, covered on the lower side with peltate scales. In dry weather the pinnae fold upward and the entire frond curves inward assuming more or less the shape of a question mark.

Found on rocks or epiphytic upon tree trunks. It prefers acid soils but may range to neutral or slightly basic soils.

Distribution: Arbuckle Mts., Greene; Sand Springs, Greene; Okfuskee Co., Greene; Murray Co., Greene; Osage Co., Greene; Le Flore Co., Palmer; Bryan Co., Wickham; Delaware Co., Tripp; Tulsa, Featherly & Still; Dripping Springs, Featherly & Still; McCurtain Co., Featherly & Still.

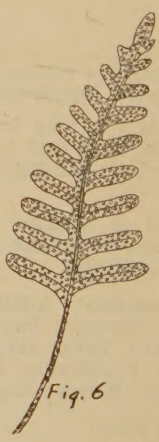


Fig. 6. *Sterile frond showing peltate scales.*

7. Notholaena sinuata (Sw.) Kaulf. Scaly Notholaena.

Fronds 3 to 6 in. long, linear oblong, pinnate, covered with imbricated, laciniate scales.

The only place that this fern has been found in Oklahoma is on a rocky limestone soil in the Arbuckle Mts.

Distribution: Arbuckle Mts., Taft; Arbuckle Mts., Greene; Murray Co., Nice & Nice; Murray Co., Featherly.

Fig. 7. Upper side of pinna.

8. Notholaena standleyi Maxon. Standley's Notholaena.

Notholaena hookeri. D. C. Eaton.

Founds 3 to 10 in. long; stipe wiry, smooth, reddish-brown; blades palmately 5-pointed, yellow powdery below.

Found on dry, rocky soil.

Distribution: Wichita Mts., Bull; Cimarron Co., Stevens; Greer Co., Stevens; Greer Co., Nice; Cimarron Co., Nice; Greer Co., Greene; Grady Co., Greene; Granite, Neuman.

Fig. 8. Frond.

9. Notholaena dealbata (Pursh) Kunze. Powdery Notholaena.

Fronds 3 to 4 in. long, more or less triangular in form, tripinnate to 4-pinnate; stipes slender, wiry, smooth, brown to black; pinnules white below.

Strictly a rock fern and is found only on limestone.

Distribution: Arbuckle Mt., Gould; Muskogee Co., Little; Osage Co., Greene; Rogers Co., Greene; Murray Co., Stevens; Ottawa Co., Stevens; Osage Co., Kimmons; Woods Co., Stevens; Murray Co., Nice & Nice; Sapulpa, Featherly & Still; Arbuckle Mts., Featherly.

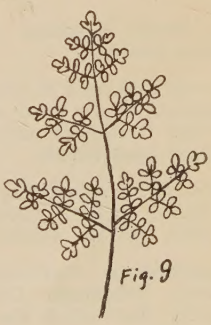


Fig. 9. Frond.

10. Adiantum pedatum L. Maiden-hair Fern. Lock-hair.

Fronds 6 to 20 in. long; stipe slender, shiny, mahogany; pinnules somewhat falcate, entire on lower margin; upper margin irregular and with sori if the frond is in the fruiting stage.

Found in rich, moist woodland soils.

Distribution: Pushmataha Co., Little & Olmsted; Le Flore Co., Little & Olmsted; Cherokee Co., Little; McCurtain Co., Nice; Le Flore Co., Palmer; Le Flore Co., Stevens; Delaware Co., Tripp; Dripping Springs, Featherly & Still; Broken Bow, Featherly.

Fig. 10. Sterile pinnule.

11. Adiantum capillus-veneris L. Venus-hair Fern.

Fronds 6 to 20 in. long with a continuous main rachis and numerous lateral branches; stipe slender, mahogany; pinnules fan-shaped with irregular outer margins; sori on outer margins of pinnules if the frond is in the fruiting stage.

Usually found hanging from moist, more or less calcareous rocks, but it is sometimes found growing upright on moist, rocky soils.

Distribution: Arbuckle Mts., Gould; Logan Co., Stevens; Caddo Co., Greene; Osage Co., Greene; Logan Co., Greene; Arbuckle Mts., Greene; Chickasha, Greene; Murray Co., Greene; Ottawa Co., Wherry; Murray Co., Nice & Nice; Cushing, Featherly & Still; Arbuckle Mts., Featherly; Broken Bow, Featherly.

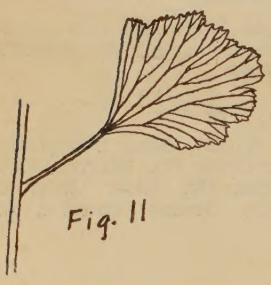


Fig. 11. Sterile pinnule.

12. Pteris aquilina L. Bracken Fern. Common Brake.

Fronds 6 in. to 4 ft. long, dull green; stipes herbaceous; blades more or less deltoid, bipinnate with the lower pinnules pinnatifid and the upper ones entire.

This fern is sometimes a weed in meadows. It is found on both woodland and grassland soils with acid to neutral reaction.

Distribution: McCurtain Co., Little & Olmsted; Bokhoma, Clark; Broken Bow, Featherly; McCurtain Co., Still.

Fig. 12. Frond and fertile pinnule.

13. Pellaea atropurpurea (L.) Link. Purple-stemmed Cliff-brake. Rock-brake. Winterbrake.

Fronds 4 to 15 in. long, leathery; stipe dark purple, shiny, more or less covered with brown hairs; pinnate or bipinnate; fertile pinnae narrow, sometimes halberd or half-halberd; sterile pinnae broad and quite variable in form.

Found on rocks or rocky soil and prefers soil with a basic to slightly acid reaction.

Distribution: Wichita Mts., Bull; McCurtain Co., Little & Olmsted; Arbuckle Mts., Gould; Muskogee Co., Little; Arbuckle Mts., Greene; Osage Co., Greene; Rogers Co., Greene; Ottawa Co., Stevens; Murray Co., Stevens; Okfuskee Co., Greene; Marshall Co., Greene; Caddo Co., Greene; Creek Co., Greene; Bryan Co., Palmer; Greer Co., Stevens; Logan Co., Stevens; Murray Co., Greene; Osage Co., Stevens; Rogers Co., Greene; Cimarron Co., Greene; White Horse Springs, Greene; Cimarron Co., Stevens; Woods Co., Stevens; Murray Co., Nice & Nice; Comanche Co., Nice & Nice; Cimarron Co., Nice & Nice; Cleveland Co., Nice & Nice; Payne Co., Featherly; Delaware Co., Tripp; Cushing, Featherly & Still.

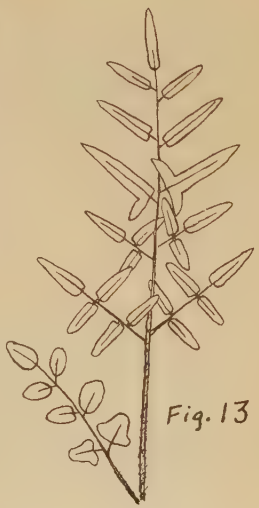
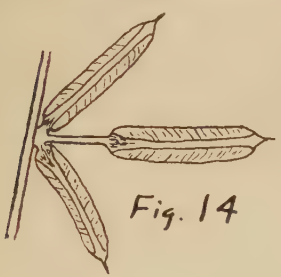


Fig. 13. Fronds showing variations of pinnae.



14. Pellaea wrightiana Hook. Cliff-brake.

Fronds 6 to 13 in. long, leathery; stipe purplish-brown, smooth; blade bipinnate; pinnae mostly 3-foliate; fertile pinnules involute with mucronate tips.

Found on dry rocks.

Distribution: Indian Territory, Sheldon.

Fig. 14. Underside of fertile pinna showing convolute pinnules.

15. Pellaea glabella Mett. Smooth Cliff-brake.

Fronds 4 to 10 in. long, glabrous; stipe dark purple, shiny; blade pinnate or pinnate above and bipinnate below; pinnae quite variable.

Found on rocks. Rare in Oklahoma.

Distribution: Comanche Co., Nice.

Fig. 15. Frond.

16. Cheilanthes alabamensis (Buckl.) Kunze. Alabama Lip-fern.

Fronds 6 to 10 in. long, smooth, bipinnate, pinnae smooth on both sides.

Found on rocks.

Distribution: Murray Co., Nice; Spavinaw Creek, Greene.

Fig. 16. The lower side of a fertile pinna.

17. Cheilanthes lanose (Michx.) Watt. Hairy Lip-fern.

Fronds 6 to 10 in. long; stipes wiry, chestnut brown, hirsute with rusty, jointed hairs; bipinnate; pinnules pinnatifid.

Found on rocks or on dry, rocky soils.

Distribution: Broken Bow, Sears; Wilburton, Clark, Muskogee Co., Little; Caddo Co., Greene; Pawnee Co., Greene; Comanche Co., Nice; Cherokee Co., Blankinship; Greer Co., Stevens; Muskogee Co., Palmer; Osage Co., Greene; Le Flore Co., Palmer; Johnston Co., Palmer; Creek Co., Bush; Comanche Co., Sheldon; Tulsa Co., Greene; Ottawa Co., Wherry.

Fig. 17. Upper side of pinna.

18. Cheilanthes horridula Maxon. Spinose Lip-fern.

Fronds small, 5 in. long or less; stipe slender, ebony-colored with tawny scales; blades bipinnate, the pinnae covered with short, spinose hairs.

Found on rocky soils which have a basic reaction.

Distribution: Arbuckle Mts., Featherly; Arbuckle Mts., Greene.

Fig. 18. The upper side of pinna.

19. Cheilanthes feei Moore. Fee's Lip-fern.

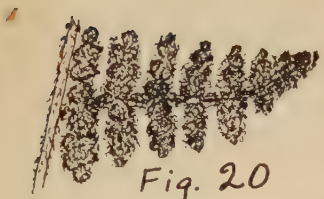
Fronds 2 to 10 in. long; stipe dark brown, woolly to glabrous; fronds bipinnate to tripinnate; pinnae hairy above and densely woolly beneath.

Found on dry, rocky soils.

Distribution: Turner's Falls, Greene; Arbuckle Mts., Nice; Turner's Falls, Featherly.

Fig. 19. The upper side of a pinna.

20. Cheilanthes eatoni Baker. Eaton's Lip-fern.



Fronds 6 to 12 in. long; stipe brown, tomentose, flexuous; blade tripinnate, densely tomentose on both sides, in fact, so much so that the pinnules are matted together; the indusia are very scant.

Found in dry, rocky places.

Distribution: Granite, Greene; Cleveland, Greene; Cimarron Co., Nice; Comanche Co., Nice; Wichita Mts., Gould.

Fig. 20. Upper side of a pinna.

21. Cheilanthes tomentsoa Link. Woolly Lip-fern.

Fronds 8 to 24 in. long; stipes brown, tomentose; blades tripinnate, densely tomentose beneath and slightly tomentose above with long, crooked hairs. The pinnules are not matted together as in C. eatoni. The indusia are well developed.

Found in dry, rocky soils with either acid or basic reactions.

Distribution: Wichita Mts., Gould; Wichita Mts., Van Vleet; Comanche Co., Palmer; Okemah, Greene; Okfuskee Co., Greene; Osage Co., Greene; Le Flore Co., Stevens; Le Flore Co., Slosson; Comanche Co., Sheldon; Creek Co., Bush; Johnston Co., Palmer; Comanche Co., Nice & Nice; Cimarron Co., Nice & Nice; Cushing, Featherly & Still; Dripping Springs, Featherly & Still; McCurtain Co., Featherly & Still.

Fig. 21. Upper side of a pinna.

22. Cheilanthes wootoni Maxon. Wooton's Lip-fern.

Fronds 4 to 12 in. long; stipe slender, brown, scaly; blade tripinnate, scaly below with ciliate scales; pinnules more or less ovate.

Found in dry, rocky soils.

Distribution: Wichita Mts., Gould; Comanche Co., Nice; Cimarron Co., Greene; Wichita Mts., Nice.

Fig. 22. The upper side of a pinna.

23. Cheilanthes fendleri Hook. Fendler's Lip-fern.

Fronds 3 to 10 in. long; stipe brown, scaly; blade scaly below and long attenuate, non-ciliate scales; pinnules more or less ovate with the terminal ones cleft or incised.

Found among dry rocks.

Distribution: Wichita Mts., Gould.

Fig. 23. The upper side of a pinna and a scale.

24. Woodsia obtusa (Spreng.) Torr. Blunt-lobed woodsia.

Fronds 4 to 20 in. long; stipe green, herbaceous, more or less scaly; blades bipinnate with pinnules pinnatifid; glandular puberulent; sori with indusia attached beneath. The indusium at first encloses the sorus but at length opens more or less star-shaped exposing the sorus.

Found on both acid and basic soils.

Distribution: Gowen, Clark; Tulsa Co., Force; Mill Creek, Sears; Arbuckle Mts., Gould; Muskogee Co., Little; Caddo Co., Greene; Creek Co., Greene; Greer Co., Greene; Logan Co., Greene; Okfuskee Co., Greene; Osage Co., Greene; Pawnee Co., Greene; Payne Co., Greene; Le Flore Co., Palmer; Creek Co., Bush; Love Co., Houghton; Johnston Co., Palmer; Greer Co., Stevens; Carter Co., Stevens; Love Co., Stevens; Payne Co., Myers; Comanche Co., Nice & Nice; Cleveland Co., Nice & Nice; Blaine Co., Nice & Nice; Craterville, Featherly; Keystone, Featherly & Still; Tulsa, Featherly & Still; Cushing, Featherly & Still; Murray Co., Featherly; Price's Falls, Featherly; Broken Bow, Featherly; Sapulpa, Jennings.

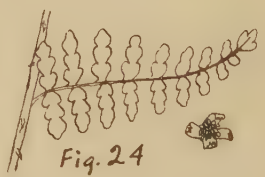


Fig. 24. The upper side of a pinna and a sorus.

25. Woodsia oregana D. C. Eaton. Oregon Woodsia.

Fronds 2 to 12 in. long, glabrous; stipes scaly below; blade bipinnatifid; the indusia inconspicuous, which makes the sorus appear naked.

Found on limestone ledges.

Distribution: Cimarron Canyon, Carleton.

Fig. 25. The upper side of a pinna and a sorus.

26. Camptosorus rhizophyllus (L.) Link. Walking fern. Walking-leaf.

Evergreen. Fronds 3 to 12 in. long, simple, entire, long, attenuate, often rooting at the tip and forming a new plant.

Found in moist, rocky places where the soil reaction ranges from acid to basic.

Distribution: Creek Co., Still; Osage Co., Stevens; Osage Co., Greene; Pawnee Co., Featherly; Ottawa Co., Wherry; Dripping Springs, Featherly & Still.

Fig. 26. The lower side of fertile fronds.

27. Asplenium trichomanes L. Maidenhair Spleenwort.

Evergeen. Fronds 3 to 10 in. long, linear in outline; stipes purple to brown, shiny; blades pinnate; pinnae not auriculate, mostly opposite, ovate and unsymmetrical.

Found on rocky soils which range from basic to slightly acid.

Distribution: Arbuckle Mts., Nice; Wichita Mts., Nice; Osage Co., Greene; Ottawa Co., Wherry; Osage Co., Regnier; Pawnee Co., Greene; Le Flore Co., Palmer; Comanche Co., Sheldon; Creek Co., Bush; Murray Co., Nice & Nice; Comanche Co., Nice & Nice, Cimarron Co., Nice & Nice; Payne Co., Featherly; Arbuckle Mts., Featherly; Broken Bow, Featherly; Dripping Springs, Featherly & Still.

Fig. 27. The lower side of a fertile pinna.

28. Asplenium bradleyi D. C. Eaton. Bradley's Spleenwort.

Fronds 3 to 8 in. long, smooth, more or less flexuous; stipes dark brown, shiny; pinnae incised or pinnatifid into toothed lobes.

Found on rocks with a basic reaction.

Distribution: Ottawa Co., Wherry.

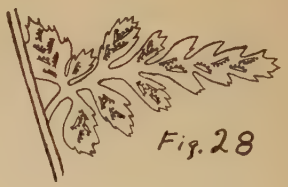


Fig. 28. The lower side of a fertile pinna.

29. Asplenium parvulum Mart. & Gal. Little Ebony Spleenwort. Small Spleenwort.

Fronds 4 to 12 in. long, evergreen, linear, glabrous, in tufts; stipe slender, black, shiny; blades once pinnate; pinnae auriculate above and sometimes below.

Found in rocky, limestone soil.

Distribution: Muskogee Co., Little; Ottawa Co., Wherry; Rogers Co., Greene; Murray Co., Greene; Tulsa Co., Greene; Ottawa Co., Stevens; Caddo Co., Stevens; Oklahoma Co., Stevens; Kay Co., Stevens; Carter Co., Stevens; Pontotoc Co., Stevens; Johnston Co., Palmer; Murray Co., Emig; Johnston Co., Houghton; Sapulpa, Featherly & Still; Turner's Falls, Featherly.

Fig. 29. Lower side of fertile frond.

30. Asplenium platyneuron (L.) Oakes. Ebony Spleenwort.

Fronds 8 to 20 in. long, evergreen, tufted; stipe reddish-brown, shiny, more or less hirsute; pinnate; the pinnae auriculate on the upper side and sometimes on the lower side and they have crenate, serrate or incised margins. The fertile fronds are upright while the sterile fronds which are smaller tend to spread out.

This is either a rock or soil fern which prefers a medium acid to a medium basic soil.

Distribution: Cleveland Co., Van Vleet; Broken Bow, Little & Olmsted; Gowen, Clark; Muskogee Co., Little; Ottawa Co., Wherry; Okfuskee Co., Greene; Osage Co., Greene; Le Flore Co., Palmer; Le Flore Co., Stevens; Pawnee Co., Greene; Creek Co., Bush; Comanche Co., Nice & Nice; Cleveland Co., Nice & Nice; Cherokee Co., Shannon; Keystone, Featherly & Still; Cushing, Featherly & Still; Broken Bow, Featherly & Still.

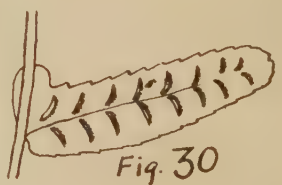


Fig. 30. The lower side of a fertile pinna.

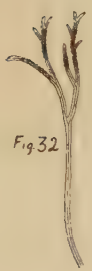
31. Asplenium pinnatifidum Nutt. Pinnatifid Spleenwort.

Fronds 3 to 6 in. long, tufted, evergreen, pinnatifid with roundish lobes, long attenuate often rooting at the tip.

Found on moist rocks which are about neutral in reaction.

Distribution: Wilburton, Featherly; Wilburton, Little.

Fig. 31. The lower side of a fertile frond.



32. Asplenium septentrionale (L.) Hoffm.

Fronds 3 to 6 in. long; stipes longer than the blades; blades irregularly pinnatifid into 2 to 5 alternate, linear, curved branches which are dentate at the apex, the sporangia often covering a zone of the segment.

Found in cracks of rocks.

Distribution: Cimarron Co., Nice.

Fig. 32. The lower side of a fertile frond.

33. Cystopteris bulbifera (L.) Bernh. Bulblet Cystopteris.

Fronds 6 to 20 in. long, lanceolate attenuate, bipinnate; stipe smooth, herbaceous; rachis wingless, often bearing small bulblets.

Found on rocks with neutral to basic reaction.

Distribution: Dripping Springs, Featherly & Still; Ottawa Co., Wherry.

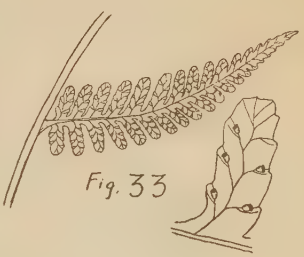


Fig. 33. The upper side of a pinna and lower side of a pinnule.

34. Cystopteris fragilis (L.) Bernh. Brittle Fern.

Fronds 4 to 16 in. long; stipe smooth; blade oblong-lanceolate, bipinnate or tripinnate with a winged rachis.

Found on medium acid to medium basic soils.

Distribution: Wilburton, Clark; Muskogee Co., Little; Ottawa Co., Stevens; Osage Co., Stevens; Osage Co., Greene; Greer Co., Stevens; Pawnee Co., Greene; Creek Co., Bush; Creek Co., Featherly & Still; Cimarron Co., Stevens; Ottawa Co., Wherry; Comanche Co., Nice & Nice; Cimarron Co., Nice & Nice; Sapulpa, Featherly & Still; Cushing, Featherly & Still; Broken Bow, Featherly.

Fig. 34. Upper side of a pinna and lower side of a fertile pinnule.

35. Polystichum arostichoides (Michx.) Shott. Christmas-fern.

Fronds 8 to 24 in. long, pinnate, evergreen; stipe and rachis scaly; sterile pinnae serrate, somewhat falcate, half-halberd; fertile pinnae contracted at top of frond.

Found in rich, moist woods and on hillsides where the soil is acid to slightly basic in reaction.

Distribution: Le Flore Co., Little & Olmsted; Broken Bow, Sears; Cherokee Co., Little; Osage Co., Stevens; Osage Co., Greene; McCurtain Co., Houghton; Le Flore Co., Stevens; Creek Co., Bush; Ottawa Co., Wherry; Sequoyah, Shannon; Delaware Co., Tripp; Dripping Springs, Featherly & Still; Broken Bow, Featherly; Cushing, James; Sapulpa, Jennings.

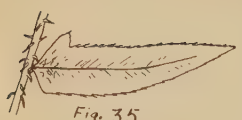


Fig. 35. The lower side of sterile pinna.

36. Aspidium thelypteris (L.) Sw. Marsh Shield-fern.

Fronds 1 to 2.5 ft. long and 4 to 6 in. wide, smooth, pinnate; the pinnae pinnatifid; fertile pinnae contracted.

Found in rich, wet woods on soils which range from medium acid to medium basic in reaction.

Distribution: Sapulpa, Bush.

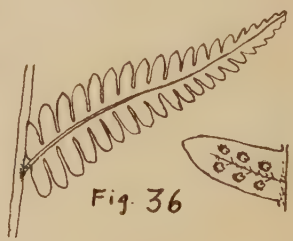


Fig. 36. The upper side of a sterile pinna.

37. Aspidium marginale (L.) Sw. Marginal Shield-fern. Evergreen-wood-fern.

Fronds 1 to 2.5 ft. long, evergreen, borne in a crown; stipe and rachis covered with shiny, brown scales; blades bipinnate, sori close to margin; indusium reniform.

Found in rocky, moist woods and soils with an acid reaction.

Distribution: Creek Co., Stevens; Pottawatomie Co., Nice; Wichita Mts., Nice; Comanche Co., Stevens; Le Flore Co., Stevens; Osage Co., Greene; Pawnee Co., Greene; Le Flore Co., Palmer; Comanche Co., Sheldon; Creek Co., Bush; Cimarron Co., Stevens; Ottawa Co., Wherry; Cimarron Co., Nice & Nice; Craterville, Patterson; Dripping Springs, Featherly & Still; Sapulpa, Jennings; McCurtain Co., Featherly & Still.

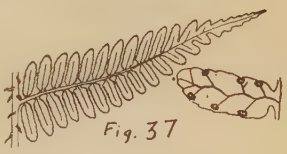
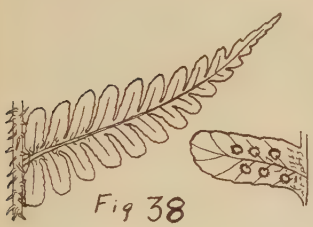


Fig. 37. Upper side of a pinna and lower side of a fertile pinnule.



38. Aspidium filix-mas (L.) Sw. Male Shield-fern. Male-fern.

Fronds 1 to 3 ft. long; stipe and rachis robust and chaffy; blades bipinnate; sori nearer the mid-vein than the margin.

Found in rocky woodlands.

Distribution: Cimarron Co., Stevens; Creek Co., Bush; Cimarron Co., Nice & Nice.

Fig. 38. Upper side of pinna and lower side of fertile pinnule.

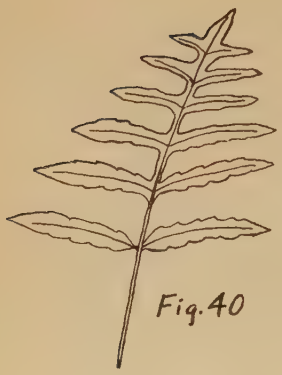
39. Phegopteris hexagonoptera (Michx.) Fee. Broad Beech-fern.

Fronds 8 to 18 in. long; stipes herbaceous, green, straw-colored; blades triangular, glandular beneath; pinnae adnate to the irregularly-winged rachis; sori near the margin.

Found in rich woodland soils which range from acid to medium basic in reaction.

Distribution: Le Flore Co., Ortenburger; McCurtain Co., Houghton; Creek Co., Bush; Le Flore Co., Palmer.

Fig. 39. The lower side of a fertile frond.



40. Onoclea sensibilis L. Sensitive Fern.

Fertile fronds 1 to 2.5 ft. long; pinnules small berry-like structures forming a terminal panicle; sterile fronds 1 to 4.5 ft. high, triangular, and pinnatifid.

Found in acid to medium basic soils.

Distribution: Osage Co., Greene; McCurtain Co., Nice; Choctaw Co., Houston; Kiamichi Mts., Emig; Creek Co., Bush.

Fig. 40. A sterile frond.

41. Athyrium aspelenioides (Michx.) Desv. Lady-fern.

Fronds 1 to 3 ft. long, bipinnate; pinnae lanceolate acuminate; pinnules incised or serrate or doubly serrate; sori curved.

Found in rich woodland soils which are acid to slightly base.

Distribution: McCurtain Co., Little & Olmsted; Le Flore Co., Stevens; Comanche Co., Stevens; McCurtain Co., Palmer; McCurtain Co., Houghton; Le Flore Co., Palmer; Broken Bow, Featherly.

Fig. 41. The upper side of a pinna and lower side of a fertile pinnule.

GLOSSARY

Acuminate. Tapering to a slender point.
Adnate. Attached or grown together.
Alternate. Occurring at different levels on opposite sides of the stem.
Amphibious. Capable of living on land or in water.
Aquatic. Living in water or water-logged soils.
Apex. The tip or summit of an organ.
Attenuate. Gradually becoming very narrow.
Auriculate. Eared; leaf with a small lobe or ear-shaped appendage.
Bipinnate. Twice pinnate.
Bulblet. A small bulb, especially such as are borne upon leaves or in their axils.
Ciliate. Fringed with fine hairs.
Circinate. Coiled like the hair-spring in a watch.
Cleft. Cut into lobes.
Convolute. Rolled together.
Crenate. With large, rounded teeth, or scalloped margin.
Crenulate. Scalloped with small, rounded teeth.
Cuneate. Wedge-shaped.
Deltoid. More or less triangular in shape.
Dentate. Toothed, with the points directed outward.
Dichotomous. Forking regularly by pairs.
Elliptical. Oblong with rounded ends.
Epiphyte. A plant which grows on another plant but does not receive nourishment from that plant.
Falcate. Scythe-shaped; curved and tapering; lopsided.
Fertile. Spore bearing.
Filiform. Thread-like.
Flexuous. Bending in a zig-zag manner.
Frond. The leaf of a fern.
Glabrous. Smooth.
Glandular. Furnished with glands.
Halberd. Like an arrowhead, but with the basal lobes pointing outward nearly at right angles.
Herbaceous. Having the character of, or similar to, an herb.
Hirsute. Having coarse, stiff hairs.
Imbricate. Having the parts overlapping like the shingles on a roof.
Incised. Cut sharply and irregularly.
Indusium. The thin, scale-like covering of the sorus.
Involute. Leaves having the edges rolled inwards at each side.
Laciniate. Cut into deep, narrow, irregular lobes; slashed.
Lanceolate. Shaped like a lance; broadest toward the base and tapering to a point.
Linear. Long and narrow.
Mucronate. Possessing a short, straight point.
Oblong. Two or three times as long as broad with nearly parallel sides.
Orbicular. Circular.
Ovate. Egg-shaped, the broadest part near the base.
Palmate. With spreading divisions like the finger of a hand; fan-shaped.
Panicle. A compound raceme which branches more or less irregularly.
Peltate. Shield-shaped; said of scales and indusia that are attached to the fronds by their centers.
Petiole. Same as stalk or stipe.
Pinna. One of the primary divisions of a pinnate or compoundly pinnate frond.
Pinnate. Compound, with the leaflets arranged on each side of a common rachis.

Pinnatifid. Pinnately cleft; leaves lobed halfway to midrib.
Pinnule. The ultimate leaflet of a bipinnate or tripinnate leaf or frond.
Puberulent. Covered with fine hair.
Rachis. The continuation of the stipe through a compound frond.
Reniform. Kidney-shaped.
Revolute. Rolled backward, as the margins of some fronds.
Rootstock. An underground stem.
Serrate. Notched on the edge like a saw.
Sessile. Without a stalk.
Sinus. The indentation between two lobes.
Sorus. A dark, granular spot or fruit dot on the under surface of a fern frond.
Spinose. Like a spine.
Sporangium. A tiny sac in which spores are produced.
Sterile. Not bearing sori.
Stipe. The petiole or stalk of a fern frond.
Tomentose. Covered with matted wool.
Tripinnate. Divided three times.

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